



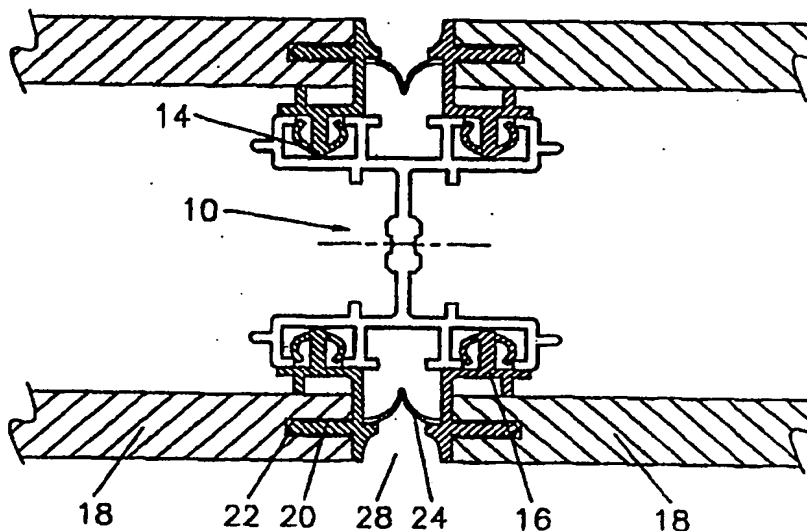
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : E04B 2/78, E04C 2/38, 2/40, E05D 1/02, E04B 1/82, 2/82		A1	(11) International Publication Number: <b>WO 98/16699</b>
			(43) International Publication Date: 23 April 1998 (23.04.98)
(21) International Application Number: PCT/AU97/00681		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 10 October 1997 (10.10.97)			
(30) Priority Data: PO 2912 11 October 1996 (11.10.96) AU			
(71)(72) Applicant and Inventor: RUDDUCK, Dickory [AU/AU]; Suite 404, 140 Sussex Street, Sydney, NSW 2000 (AU).			
(74) Agents: MOORE CHRYSILIOU, Kerry et al.; Chrysiliou Moore Martin, CMC Centre, 143 Sydney Road, Fairlight, NSW 2094 (AU).		Published With international search report.	

(54) Title: BUILDING ELEMENTS

## (57) Abstract

The invention concerns a building element which is a stud (10) having a number of channels (12). Each channel can receive a cooperating means (14) which can be used to mount a panel or bracket on the stud. The invention also concerns a building element which is a joining clip (16) which can be connected to a panel or bracket. The joining clip includes the cooperating means (14) for mounting a panel or bracket on the stud. The invention also concerns a building element which is a joining element (42) which can connect one panel to another. The joining element is hinged (46). The invention also discloses two types of bracket for mounting in the stud. The first type has a screw-threaded shaft (71) and a sleeve (72) with cooperating means (73) at one end of the sleeve. The cooperating means is shaped so that it can be inserted horizontally in a channel of the stud and rotated so that the cooperating means cannot be withdrawn horizontally from the channel. The bracket may thereafter be locked into position in the channel. The second type of bracket has two arms (81, 82) at an angle to each other (83). Cooperating means (84) are located at one end of one arm (81). The cooperating means is shaped so that it can be inserted horizontally in a channel of the stud and rotated so that the cooperating means cannot be withdrawn horizontally from the channel. The one arm of the bracket may thereafter be pushed into position in the channel. A track (60) is adapted to be hung from a horizontal surface (61), the track having a gutter (59) adapted to receive a connecting clip (63) attached to an end of a panel (18), the track also having a channel (59) adapted to receive a masking clip (64) adapted to conceal the end of the channel.



*FOR THE PURPOSES OF INFORMATION ONLY*

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

## BUILDING ELEMENTS

## TECHNICAL FIELD

This invention relates to the construction industry; more particularly, this invention relates to certain building elements useful in construction, especially for the building of internal walls and partitions, although the invention is not necessary limited to this application.

## BACKGROUND ART

For many years it has been the normal practice in the construction industry to construct internal walls from plasterboard, attached to wooden or metal studs. To install plasterboard walls with an acceptably smooth finish, and to set the joints between adjacent plasterboard panels, it is necessary to employ skilled plasterboard "setters". This not only increases costs, but influences the building timetable; to achieve maximum efficiency, a building should be prepared to the stage where all plasterboard walls can be installed at one time, so that the setters are on site for the minimum time necessary. A significant cost drawback is the fact that it is unavoidable that this work must be carried out on site.

Once the plasterboard walls have been installed, they need to be sanded before being painted. The sanding procedure creates a significant amount of gypsum dust, with a consequent effect on all articles and material on the site. Moreover, because it is necessary to paint plasterboard, the cost of painting is a significant part of building.

Should it become necessary to repair a plasterboard wall, if a professional finish is required, it is necessary to call in a plasterboard setter and to endure the dust created during the sanding procedure. In addition, it is necessary to repaint the wall after repair.

There is a further problem associated with plasterboard walls, which arises during demolition. Demolition of internal plasterboard walls is frequently necessary in commercial buildings, for example, when a tenant leaves the building. Demolition of plasterboard walls is usually also necessary during refurbishment. Plasterboard walls cannot be dismantled without substantial damage to the plasterboard, to the extent that the plasterboard is not reusable. Even more significantly, substantial gypsum dust is created. It is believed that the inhalation of gypsum dust may have a deleterious effect on health. Consequently, in some jurisdictions, safe work practices require that adjacent areas are evacuated during the demolition of plasterboard walls. This can result in loss of rent for a landlord and interruption of business and loss of profits for a tenant.

After plasterboard walls have been demolished, the plasterboard has a "negative" value in that it is necessary to pay for its removal and disposal. Plasterboard and its framing is not recyclable on an economic basis. It is an aim of the present invention to provide a construction system which can avoid the use of plasterboard panels and hence the difficulty and cost involved in construction, repair and demolition involving plasterboard panels.

It is a further object of this invention to provide a building system which can permit wall panels to be reusable.

It is a further object to provide, in one aspect of the invention, a system which can use wall panels already finished in the factory, so that painting on site is not required.

When wall panels, plasterboard or otherwise, are transported to a building site, damage frequently occurs. In many cases, the damage is relatively minor, and one side of the panel is usable.

It is an object of this invention, in one aspect, to provide a building element which will permit a panel to be erected with

either side outermost.

During occupation of buildings, damage is occasionally caused to wall panels. Rather than obtain a replacement panel, it would be desirable to be able to detach the panel and reverse it so that the damaged side is concealed in the wall cavity. This invention, in one aspect, aims to provide that capability.

It is yet a further object of this invention to provide a building system which can be integrated with furniture, especially office furniture, such as work stations.

#### DISCLOSURE OF THE INVENTION

Accordingly, this invention provides a building element being a stud, characterised in that the stud has a plurality of channels, each channel being adapted to receive a cooperating means for the purpose of mounting a panel or bracket on the stud.

Preferably, the stud has three longitudinal channels, which ideally are set out side by side. Even more preferably, the stud has a first side and a second side opposing the first, and there is one set of three longitudinal channels arranged on the first side and a second set of three longitudinal channels arranged on the second side.

The cross-sectional shape of each channel can be determined by the way in which it is intended to receive the cooperating means. In one preferred embodiment, rather than being "U" shaped, it is preferred that each channel is formed with return rims, so that the channel is "C" shaped in cross-section; however, it is greatly preferred that the base of the channel is flat.

The stud may be manufactured from any suitable material; it has been found that aluminium is acceptable, and has the added

advantage that aluminium is recyclable. However, the stud may be made from other materials.

The co-operating means for mounting panels or brackets to the stud is preferably a joining clip, which is also novel.

Consequently, this invention also provides a building element being a joining clip adapted to mount a panel or bracket to the stud of the invention, the joining clip having means for cooperating with a channel of the stud and means for connecting the joining clip to a panel or bracket.

In a preferred embodiment, the joining clip is made of plastic such a polyvinyl chloride (PVC) or other suitable material. If desired, the joining clip may have parts of varying resiliency, formed for example by multi-moulding.

Certain preferred configurations of the cooperating means are illustrated in the accompanying drawings, but the invention is not necessarily limited to these configurations.

As will be seen from the examples in the drawings, the joining clip can perform the function of providing a neat finish to the ends of panels. The clip preferably extends along the length of an edge of each panel for this reason and also to provide maximum strength and stability to the assembled wall.

The means for connecting the clip to a panel may follow, inter alia, either of two methods of construction. In the first method, the panel may be provided with a longitudinal groove in at least one edge (preferably also in the edge opposite the first), in which case the joining clip may have a protrusion, especially a saw-toothed protrusion, which is a push-fit into the groove. This method is illustrated in the drawings. In the second method, the panel end is tapered or shaped to fit within a complementary channel formed in the joining clip. In both cases, it is intended that the material of the clip and the close fit with the panel provides a stable arrangement under

normal conditions, but that the use of appropriate force will separate the clip from the panel when required, for example, so that the panel can be reversed.

It is to be understood, however, that it is not an essential part of this invention that the joining clip can be removed from the panel, bracket or the like. In some applications, for example, in wet areas, the panel may be waterproof on one side only and there will be no need to be able to strip the joining piece from the panel.

In addition, the means for connecting the joining clip to a panel may be adhesive, or other suitable means.

In the case of panels around internal or external corners, a new joining element has been devised, which also forms part of the present invention. The joining element of the invention is adapted to annex a first panel to a second panel, and has first means for connecting the joining element to the first panel, second means for connecting the joining element to the second panel and hinge means located between the first and second connection means, the hinge means comprising a resilient bridge.

The connection means may be any of those described in relation to the joining clip, or any other suitable means.

The joining element may also perform the function of providing a neat and functional finish to the ends of panels, like the joining clip. The joining element preferably extends along the length of each panel end for this reason and can also provide maximum strength and stability to the assembled wall.

As indicated, a channel of the stud of the invention may be adapted to receive a cooperating means for the purpose of mounting a bracket, rather than a panel, on the stud. The bracket in turn may serve to connect furniture or panels to the stud, or may be used for other purposes.

Preferably, the bracket to be used in this context takes one of two forms. Both are provided by this invention.

Accordingly, this invention provides in one form a bracket for mounting on the building element, being a stud, of the present invention, the bracket comprising a screw-threaded shaft and a sleeve therefor, the sleeve having at one end a cooperating means adapted to be inserted in a channel of the stud, the channel having first and second ends, wherein the cooperating means is shaped so as to be capable of insertion in the channel at any location between the first and second ends and capable of manipulation to a position where the cooperating means cannot be withdrawn from the channel except at the first or second end, and wherein screwing of the shaft within the sleeve in a direction towards the channel is adapted to lock the bracket in the channel.

Preferably, the channel of the stud is "C" shaped in cross-section, except that it has a flat base. In this context, the cooperating means is preferably generally rectangular in cross-sectional shape, except that one pair of opposing corners of the rectangle are cut off or one corner is rounded off.

The longer dimension of the rectangle complements the width of the base of the channel. The shorter dimension of the rectangle enables the cooperating means to be inserted in the channel between the upstanding arms and flanges forming the channel with the base. Rotation of the cooperating means through 90 degrees, so that the longer dimension of the rectangle lies transversely to the length of the channel prevents withdrawal of the bracket from the channel. The cut-off corners (or the single rounded off corner) of the rectangle permit this rotation to take place. The bracket may then be locked into position in the channel by screwing the shaft in a direction towards the base of the channel.

In another form, this invention provides a bracket for mounting



on the building element, being a stud, of the present invention, the bracket comprising a shaft having first and second arms forming an angle between them, the first arm having at one end a cooperating means adapted to be inserted in a channel of the stud, the channel having first and second ends, wherein the cooperating means is shaped so as to be capable of insertion in the channel at any location between the first and second ends and capable of manipulation to a position where the cooperating means cannot be withdrawn from the channel except at the first or second end, and wherein the first arm is adapted to fit substantially within the channel.

With this form of the bracket, it is also preferred that the channel of the stud is "C" shaped in cross-section, except that it has a flat base. In this context, the cooperating means is preferably generally rectangular in cross-sectional shape, except that one corner of the rectangle is rounded off. The longer dimension of the rectangle complements the width of the base of the channel. The shorter dimension of the rectangle enables the cooperating means to be inserted in the channel between the upstanding arms and flanges forming the channel with the base. Rotation of the cooperating means through 90 degrees, so that the longer dimension of the rectangle lies transversely to the length of the channel prevents withdrawal of the bracket from the channel. The rounded off corner of the rectangle permits this rotation to take place. As an alternative to rounding off a corner, a pair of opposing corners may be cut off, as in the case of the first embodiment of the bracket described above.

In order to permit the first arm to lie substantially within the channel, it is preferred that the cooperating means is curved in the longitudinal direction as shown in the drawings. The first arm may also have an O-ring of rubber or other resilient material to assist a tight fit of the first arm in the channel.

When the first arm lies substantially within the channel and a

force is exerted on the second arm, in a direction away from the first arm, the bracket in this embodiment locks into the channel.

It will be appreciated that, with either form of the bracket of the invention, items such as furniture may be hung from the stud.

The brackets of the invention have substantial advantages over prior art brackets, because they may be inserted in a channel of the stud at any point along its length, whereas prior art brackets must enter a channel at one end thereof. This creates problems in changing furniture, for example. In addition, using the brackets of the present invention, it is possible to insert new brackets above or below existing brackets without having to remove the existing brackets from the channel. Further, removal of any bracket is a simple task, in contrast to the prior art.

The present invention also provides a ceiling track which may be used in conjunction with the building elements of the present invention. Accordingly, this invention provides a track adapted to be hung from a horizontal surface, the track having a gutter adapted to receive a connecting clip attached to an end of a panel, the track also having a channel adapted to receive a masking clip adapted to conceal the end of the channel.

The horizontal surface may be a ceiling or a beam or joist, for example. The track of the invention may be hung from the horizontal surface by any suitable means, such as by screws, nails or other fixing means.

The connecting clip preferably is shaped to complement the shape of the gutter. The connecting clip may be attached to the end of the panel by any desired method, an example of which is gluing.

Figure 9 shows a sixth version of the joining clip of the invention;

Figure 10 shows in cross-sectional plan view the stud of Figure 6 in conjunction with the joining clip of Figure 9;

Figure 11 shows detail of a cover trim;

Figure 12 is a cross-sectional plan view of the stud of Figure 6, illustrating the use of the joining clip of Figure 7 as well as a seventh version of the joining clip of the invention;

Figure 13 is a cross-sectional plan view of the stud of Figure 6, illustrating the use of the joining clip of Figure 7, and showing how the gap between panels may be treated;

Figure 14 is a cross-sectional plan view of the stud of Figure 6, illustrating the use of the joining clip of Figure 7, showing a different treatment of the gap between panels;

Figure 15 shows how wall panels can be integrated with a glass panel, using a suitably shaped decorative extrusion, the joining clip being similar to that in Figure 1;

Figure 16 is similar to Figure 15, except that the joining clip is that in Figure 2;

Figure 17 shows integration of the wall panels with a door, once again, using a suitable decorative extrusion;

Figure 18 illustrates in cross-section an assembly of the stud and joining clips of the invention at a corner and including a glass panel;

Figure 19 illustrates in cross-section an assembly of the stud and joining clips of the invention at a wall end and including two glass panels;

Figure 20 shows an assembly including door jambs;

Figure 21 is a vertical section of a door top, showing how the track of the invention may be utilised as a lintel;

Figure 22 shows one embodiment of the joining element of the invention,

Figure 23 shows in cross-sectional plan view the joining element of Figure 22 joining panels around an external corner;

Figure 24 shows a second embodiment of the joining element of the invention;

Figure 25 shows in cross-sectional plan view the joining element of Figure 24, joining panels around an internal corner;

Figure 26 shows in vertical section the track of the invention used to hang panels, with masking clips top and bottom;

Figure 27 is similar to Figure 26, except that the masking clip at the bottom of the panels is different;

Figure 28 is a side elevation of one form of a bracket according to the invention;

Figure 29 is a plan view, in direction A, of the bracket of Figure 28;

Figure 30 shows a plan view of the bracket of Figure 28, in direction B, after initial insertion in a channel of the stud of the invention;

Figure 31 shows a plan view of the bracket of Figure 28, in direction B, locked into a channel of the stud of the invention;

Figure 32 is a side elevation of a second form of bracket according to the invention;

Figure 33 is an end view of the bracket of Figure 32, in direction C;

Figure 34 is a top view of the head of the bracket in Figure 32; and

Figure 35 shows the bracket of Figure 32 locked into a channel of a stud of the invention.

In the drawings, especially Figures 1 to 3, stud 10 has two sets of three identical channels 12, each being "C" shaped, but with a flat base 13. Channels 12 are shaped so that each cooperating means 14 on joining clip 16, with relatively resilient arms 14a and 14b (refer Figure 4), forms a hermetic seal when pushed into channel 12.

In Figure 1, clip 16 is attached to panel 18 by gluing or other suitable means. In Figure 2, however, clip 16 is attached to panel 18 by pushing protrusion 20 into groove 22 in panel 18. Extension 24 on clip 16 closes off gap 28 between panels 18. Extension 24 may be of a softer material than the rest of clip 16.

Leg 30 on clip 16 (see Figure 3, for example) serves to space panel 18 from stud 10.

In Figures 5 and 6, joining clip 116 has, as well as protrusion 20 and extension 28, cooperating means 15 with angled arm portions 15a and 15b, designed to clip into channel 12, as seen in Figure 6.

The joining clip 216 in Figures 7 and 8 is similar to clip 16 in Figure 1, in that it is attached to panels 18 by gluing along surfaces 17. However, clip 216 in Figure 7 has the same cooperating means 15 as clip 116 in Figure 5.

The joining clip 316 in Figures 9 and 10 is particularly suitable for imparting a finished appearance to abutting panels 18 and can provide added stability through extension 19. Cooperating means 15 is the same as that in Figures 5 and 7.

Figures 11 and 12 show trim 21 with extension 25 which works with extension 24 on clip 116 (see Figure 12) to close off gap 29 between panel 18 and extrusion 32. In addition, trim 21 fits into gap 31 of decorative extrusion 32.

Figure 13 details how base 13 of centre channel 12 may be painted; base 13 can be seen between panels 18 and its painted colour may tone or contrast with that of panels 18.

Figure 14 shows the insertion of a moulding 23 in the gap between panels 18.

In Figures 15 and 16, decorative extrusion 32 neatly ends the wall system and provides a fixing facility for glass panel 34.

Figure 17 shows door 36 integrated with the wall system of the invention but includes extrusion 38 which carries a channel 40 for a felt (not shown) or other insulating strip.

In Figure 18, panels 18 form a wall end with end panel 54. It will be noted in this drawing that clips 216 are offset relative to each other; this illustrates the versatility of the stud of the present invention.

Figure 19 shows merely one arrangement of wall end and glass panels 34.

Figure 20 illustrates how door 36 may be mounted between walls using the system of the invention. Felt 62 is shown in channel 40 of extrusion 38.

Figure 21 shows how the same extrusion 38 may be used to provide a rest at the top of door 36, in the form of felt or

rubber 62 in channel 40. Track 60 is attached to ceiling 61 and also secures extrusion 38 and provides a mount for masking clips 64. Each masking clip 64 has an arm 58 which is a push fit into channel 57 in track 60.

In Figures 22 and 23, joining element 42 has protrusions 20 which fit into grooves 22 of panels 18. Joining element 42 permits panels 18 to form an external corner, so that faces 43 and 44 provide a neat finished appearance.

Hinge 46 connects faces 43. Because hinge 46 is resilient, it allows panels 18 to adopt a configuration that is other than 90 degrees. This is useful to form both normal corners and unusual angles; even normal corners are rarely at exactly 90 degrees, and the joining element of the invention accommodates this discrepancy.

In Figures 24 and 25, joining element 50 has protrusions 20 which fit into grooves or channels 22 in panels 18, which can form an external corner. Hinge 52 connects faces 53. In the external corner formed, hinge 52 provides a neat finished appearance.

Figure 26 shows the same track 60 as in Figure 21, but this time panels 18 are supported by track 60, by hooking protrusions 63 into gutters 59. The top ends 26 of panels 18 are covered by masking clips 64, with arms 58 push-fitted into channels 57.

The lower ends 27 of panels 18 are also covered by masking clips 64, arms 58 of which are a push-fit into channels 56 of track 51. Track 51 is attached to floor 55.

Figure 27 has the same top arrangement as that in Figure 26. However, the arrangement at the lower ends 27 of panels 18 is different, in that instead of masking clips 64, skirting extrusion 65 is attached to panels 18, either by gluing on surface 66 or by screwing through notch 67.

Turning now to Figures 28 to 31, bracket 70 is made of metal or other suitable material or combinations of material, and has shaft 71 inserted in sleeve 72. Shaft 71 is screw threaded for all or the lower part of its length contained within sleeve 72. Shaft 71 has a screw head 74 containing a slot 75 to accept the blade of a screwdriver or other suitable tool.

Sleeve 72 has at one end cooperating means 73 and at the other end a flange 76. As may be seen in Figure 29, cooperating means 73 is shaped in end view to resemble a rectangle except that one pair of opposing corners is cut off (refer 77 and 78). Flange 76 has the same cross-sectional shape as cooperating means 73.

As can be seen in Figure 30, cooperating means 73 can be inserted horizontally into channel 12 of a stud 10, and then rotated through 90 degrees to be retained in channel 12 as shown in Figure 31. Screwing of shaft 71 towards base 13 of channel 12 (by using a blade inserted in slot 75) will lock bracket 70 into channel 12. Furniture components or other items, including panels, may then be attached to shaft 71, as desired.

The cross-sectional shape of flange 76 echoes that of cooperating means 73, so that the orientation of cooperating means in channel 12 can be ascertained.

Turning now to Figures 32 to 35, metal bracket 80 has two arms, 81 and 82, forming between them a right angle 83. Arm 81 has cooperating means 84. Arm 82 has screw threaded extension 85, for attaching furniture components or other building components, as desired.

O-ring 86 mounted on arm 81 helps to ensure a snug fit of arm 81 within channel 12 (refer Figure 35).

Cooperating means 84 is generally rectangular in shape, except that one corner is rounded off at 87. The purpose of this is



so that cooperating means 84 may be inserted in channel 12 of a stud 10, in a similar manner to cooperating means 73 of bracket 70, then rotated horizontally through 90 degrees with the assistance of rounded off corner 87, trapping bracket 80 in channel 12. Bracket 80 may then be rotated vertically through 90 degrees, so that arm 81 is caused to lie substantially within channel 12, o-ring 86 serving to wedge arm 81 in this position.

It will be appreciated by one skilled in the art that a load placed on arm 82 will enhance the locking of bracket 80 in channel 12.

It will be readily appreciated by one skilled in the art that cooperating means 14 in the embodiment shown in some of the drawings (such as Figures 1, 2 and 3) has the considerable advantage of sealing panel 18 hermetically, for the length of the panel 18. This means that the system of the invention can provide substantial insulation against transmission of noise and the conductivity of heat and cold. There are also obvious advantages in dealing with "wet" areas, such as bathrooms.

#### INDUSTRIAL APPLICABILITY

The building elements, brackets and track of the invention are clearly a substantial advance in the art. The examples referred to herein are illustrative and are not to be regarded as limiting the scope of the invention.

## CLAIMS

1. A building element being a stud, characterised in that the stud has a plurality of channels, each channel being adapted to receive a cooperating means for the purpose of mounting a panel or bracket on the stud.
2. The building element as claimed in claim 1, wherein the stud has three longitudinal channels.
3. The building element as claimed in claim 1, wherein the stud has a first side and a second side opposing the first, and wherein one set of three longitudinal channels is arranged on the first side and a second set of three longitudinal channels is arranged on the second side.
4. The building element as claimed in any one of claims 1 to 3, wherein each channel is "C" shaped in cross-section.
5. The building element as claimed in claim 1, wherein the stud is manufactured from aluminium.
6. A building element being a joining clip adapted to mount a panel or bracket to the stud claimed in any one of claims 1 to 5, characterised in that the joining clip includes the cooperating means and also includes means for connecting the joining clip to the panel or bracket.
7. The building element as claimed in claim 6, wherein the joining clip is made of a plastic material.
8. The building element as claimed in claim 6, wherein the joining clip has parts of varying resiliency.
9. The building element as claimed in claim 6, wherein the clip is adapted to mount a panel to the stud, the panel has a longitudinal groove in an edge thereof and the connecting means comprises a protrusion adapted to fit closely within the groove.

10. The building element as claimed in claim 9, wherein the protrusion is saw-toothed.

11. The building element as claimed in claim 9 or 10, wherein the longitudinal groove extends for substantially the whole length of the edge of the panel and the connecting means substantially fills the length of the groove.

12. The building element as claimed in claim 6, wherein the clip is adapted to mount a panel to the stud, the connecting means comprises a groove and the panel has an edge of a complementary shape to, and adapted to fit closely within, the groove.

13. The building element as claimed in claim 12, wherein the panel has a tapered edge.

14. The building element as claimed in claim 12 or 13, wherein the groove embraces substantially the whole length of the edge of the panel.

15. The building element as claimed in claim 9 or 12, wherein after assembly of the connecting means and the panel, the exertion of appropriate force is capable of separating the panel and the connecting means without damage to the joining clip or the panel.

16. A building element being a joining element adapted to annex a first panel to a second panel, the joining element having first means for connecting the joining element to the first panel, second means for connecting the joining element to the second panel and hinge means located between the first and second connection means, characterised in that the hinge means comprises a resilient bridge.

17. The building element as claimed in claim 16, wherein the first panel has a longitudinal groove in an edge thereof, the second panel has a longitudinal groove in an edge thereof, the

first connecting means comprises a protrusion adapted to fit closely within the groove of the first panel and the second connecting means comprises a protrusion adapted to fit closely within the groove of the second panel.

18. The building element as claimed in claim 16, wherein each of the first and second connecting means comprises a groove, the first panel has an edge of a complementary shape to, and adapted to fit closely within, the groove of the first connecting means and the second panel has an edge of a complementary shape to, and adapted to fit closely within, the groove of the second connecting means.

19. The building element as claimed in claim 17, wherein each longitudinal groove extends for substantially the whole length of the edge of the respective panel and the connecting means substantially fills the length of the groove.

20. The building element as claimed in claim 18, wherein the groove of the first connecting means embraces substantially the whole length of the edge of the first panel and the groove of the second connecting means embraces substantially the whole length of the second panel.

21. A bracket for mounting on the building element claimed in any one of claims 1 to 5, wherein the bracket comprises a screw-threaded shaft and a sleeve therefor, the sleeve having at one end a cooperating means adapted to be inserted in a channel of the stud, the channel having first and second ends, wherein the cooperating means is shaped so as to be capable of insertion in the channel at any location between the first and second ends and capable of manipulation to a position where the cooperating means cannot be withdrawn from the channel except at the first or second end, and wherein screwing of the shaft within the sleeve in a direction towards the channel is adapted to lock the bracket in the channel.

22. A bracket for mounting on the building element claimed in any one of claims 1 to 5, wherein the bracket comprises a

shaft having first and second arms forming an angle between them, the first arm having at one end a cooperating means adapted to be inserted in a channel of the stud, the channel having first and second ends, wherein the cooperating means is shaped so as to be capable of insertion in the channel at any location between the first and second ends and capable of manipulation to a position where the cooperating means cannot be withdrawn from the channel except at the first or second end, and wherein the first arm is adapted to fit substantially within the channel.

23. The bracket as claimed in claim 21 or 22, wherein the channel of the stud is "C" shaped in cross-section, except that it has a flat base and the cooperating means is generally rectangular in cross-sectional shape, except that one pair of opposing corners of the rectangle are cut off.

24. The bracket as claimed in claim 21 or 22, wherein the channel of the stud is "C" shaped in cross-section, except that it has a flat base and the cooperating means is generally rectangular in cross-sectional shape, except that one corner of the rectangle is rounded off.

25. A track adapted to be hung from a horizontal surface, the track having a gutter adapted to receive a connecting clip attached to an end of a panel, the track also having a channel adapted to receive a masking clip adapted to conceal the end of the channel.

26. A track as claimed in claim 25, wherein the connecting clip is shaped to complement the shape of the gutter.

27. A track as claimed in claim 25 or 26, wherein the channel adapted to receive the masking clip is shaped so as to provide a good friction fit with the clip.

28. A track as claimed in any one of claims 25 to 27, which has two of the gutters and two of the channels adapted to receive a masking clip.

1/17

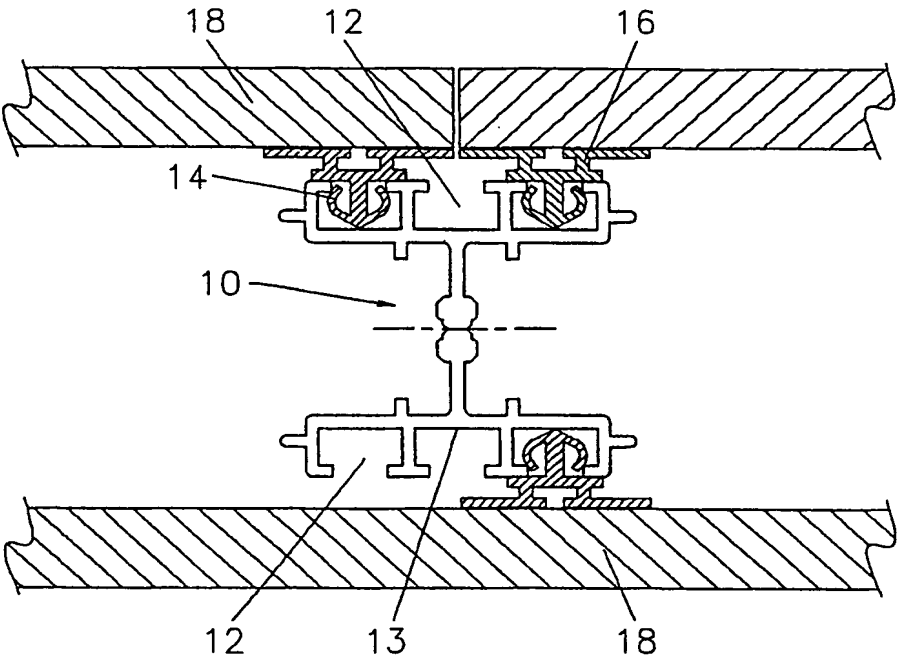


FIGURE 1

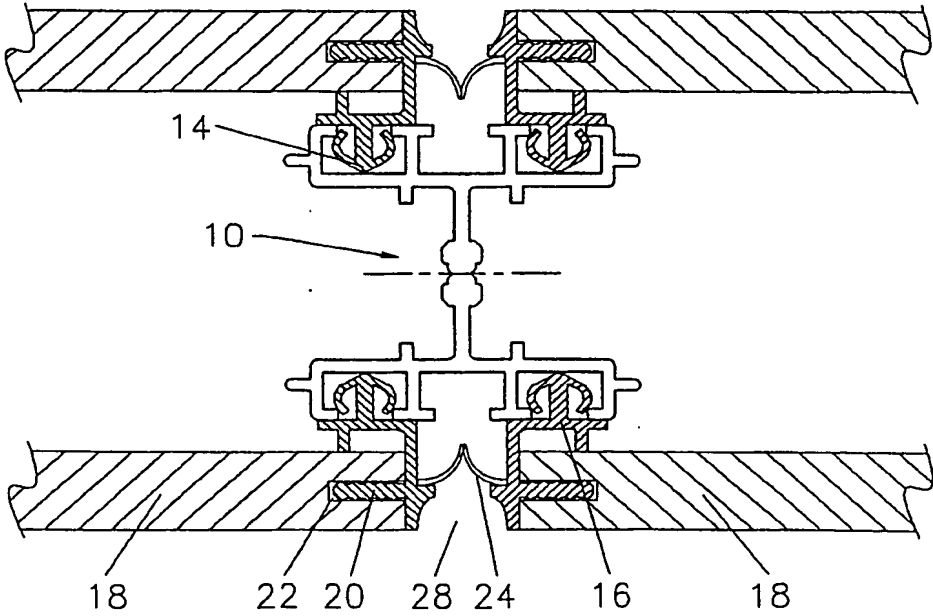


FIGURE 2

2/17

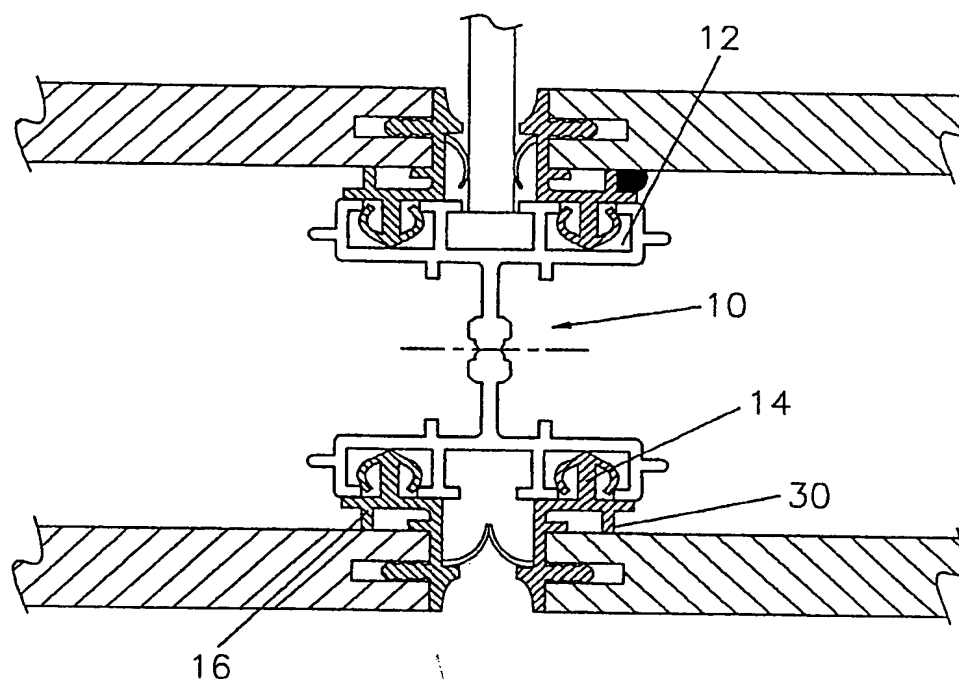


FIGURE 3

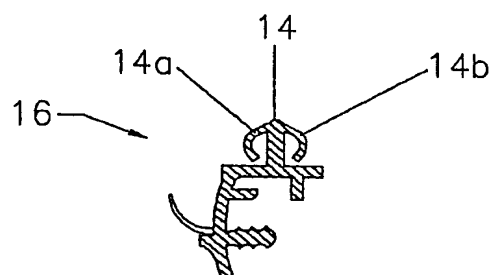


FIGURE 4

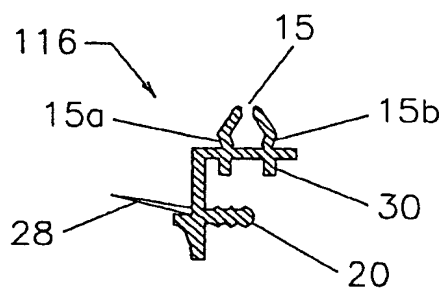


FIGURE 5

3/17

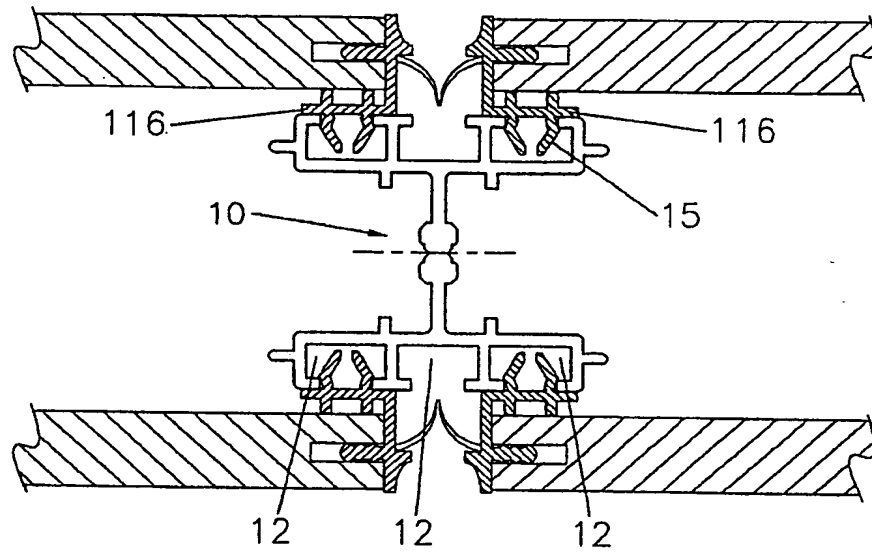


FIGURE 6

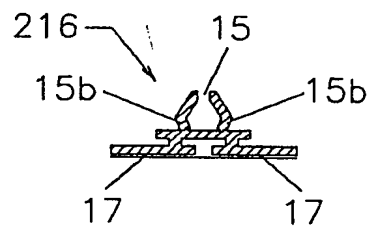


FIGURE 7

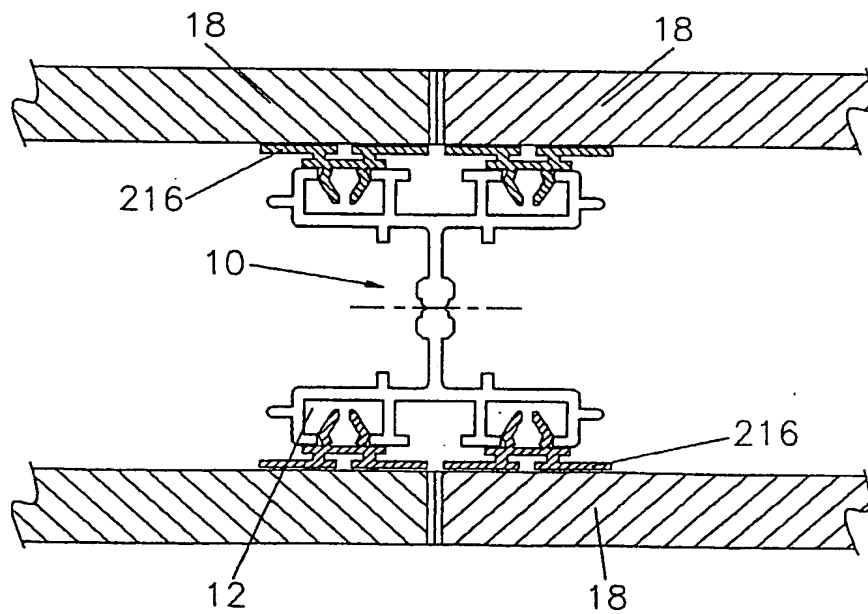


FIGURE 8



4/17

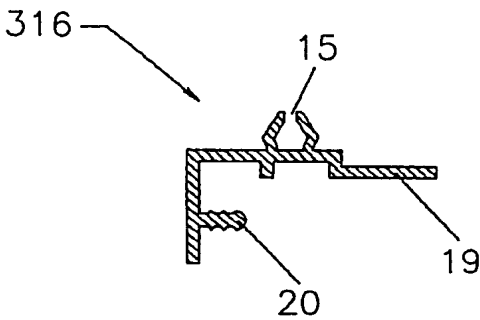


FIGURE 9

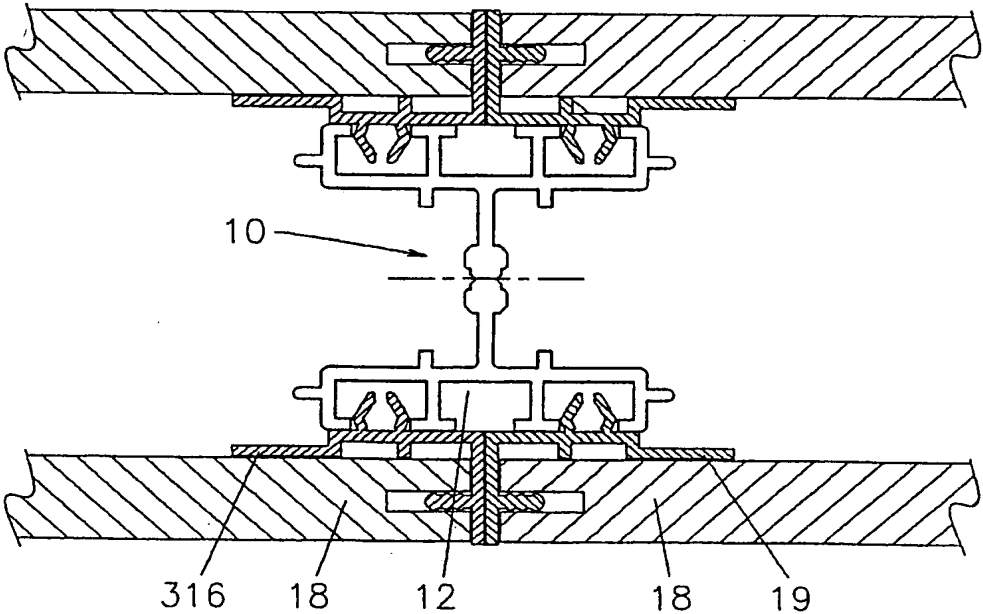


FIGURE 10

5/17

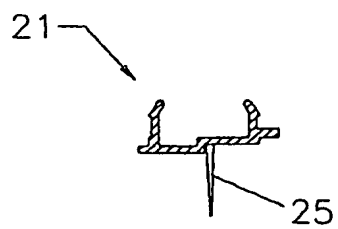


FIGURE 11

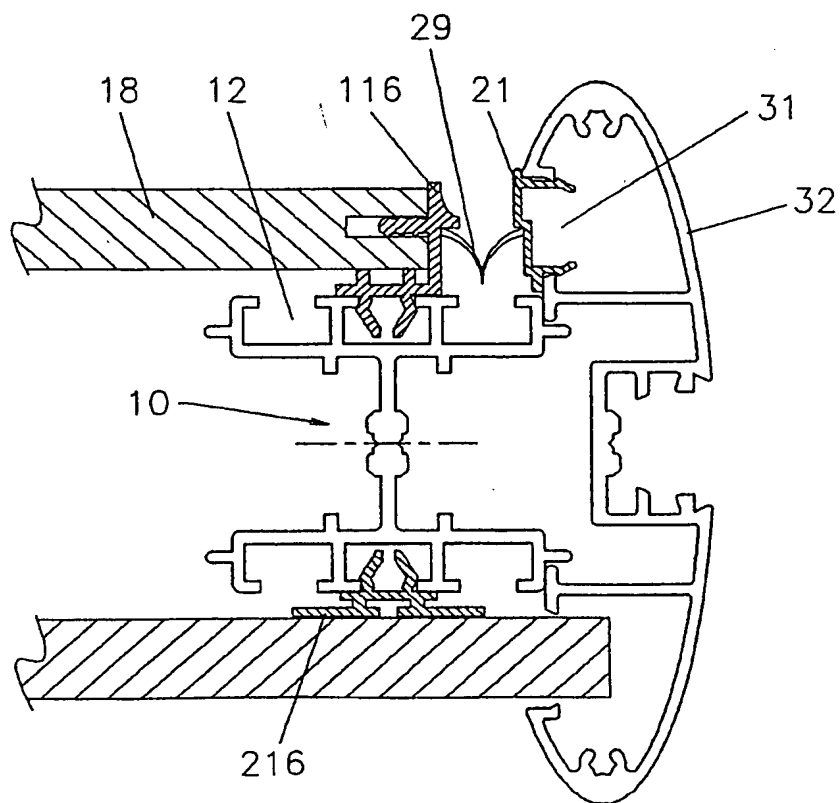


FIGURE 12

6/17

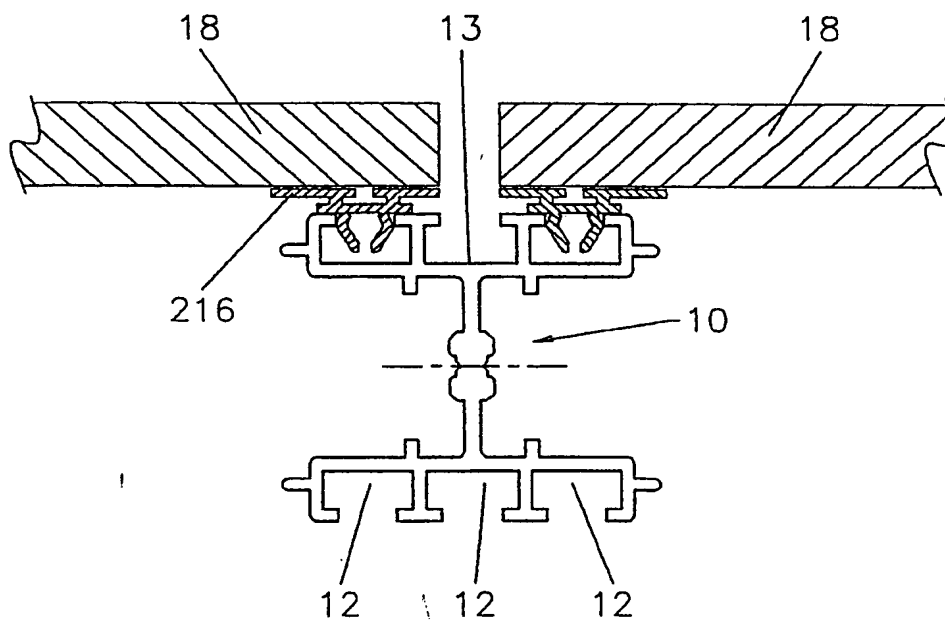


FIGURE 13

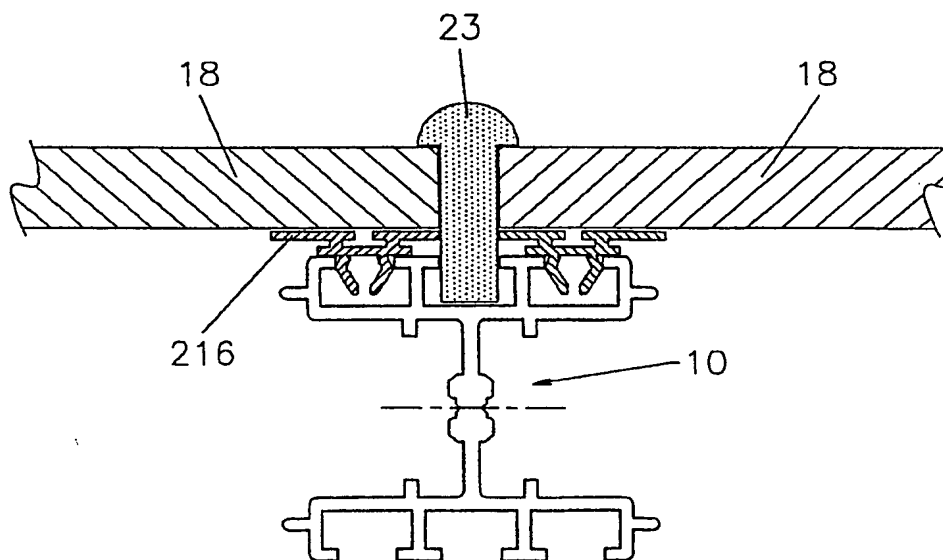


FIGURE 14

7/17

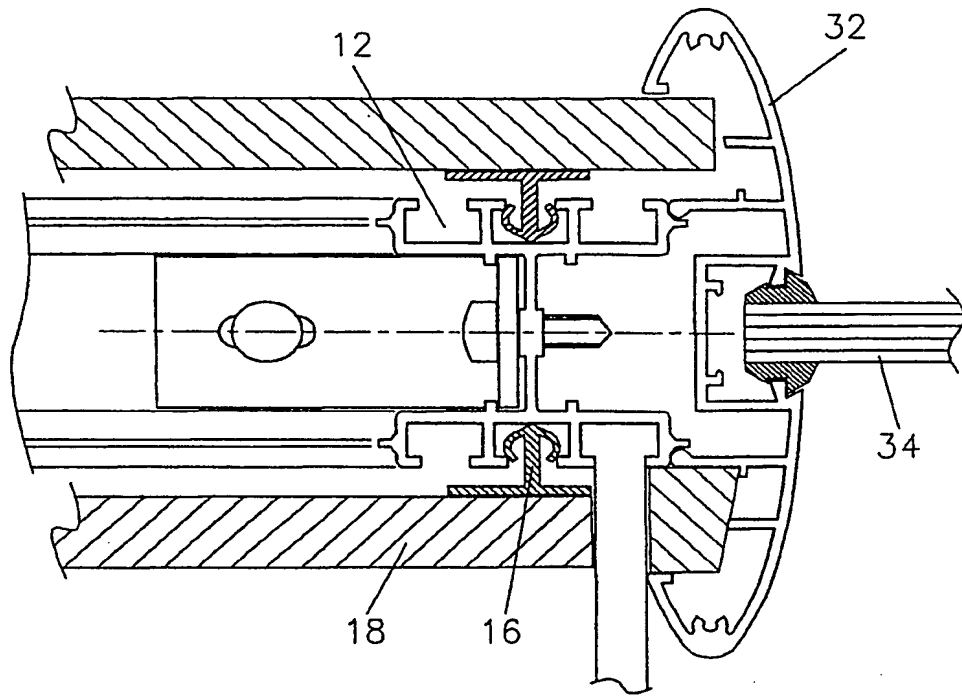


FIGURE 15

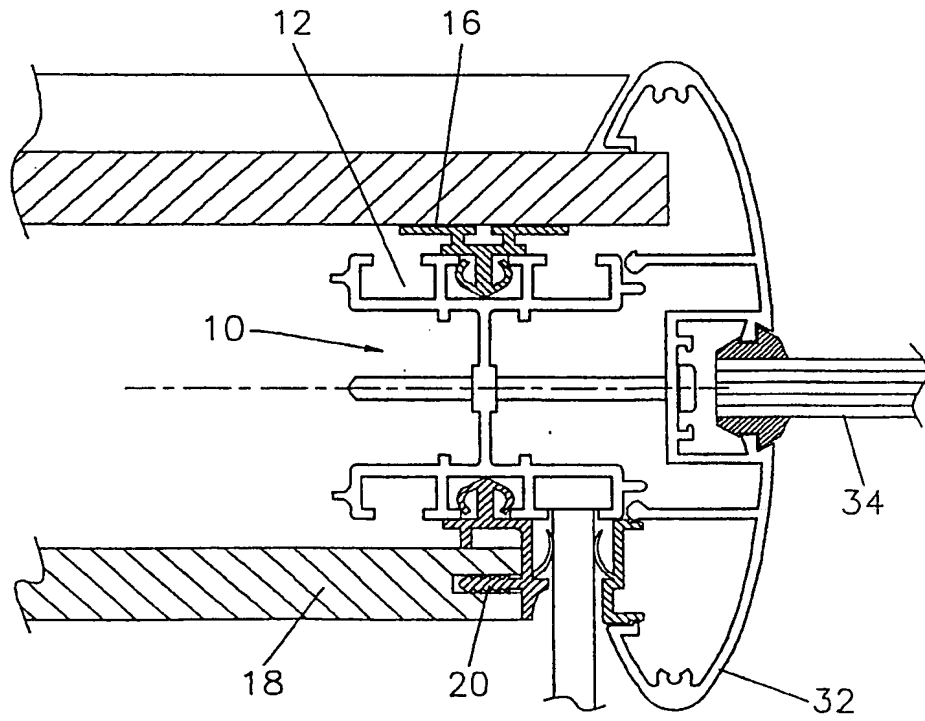


FIGURE 16

8/17

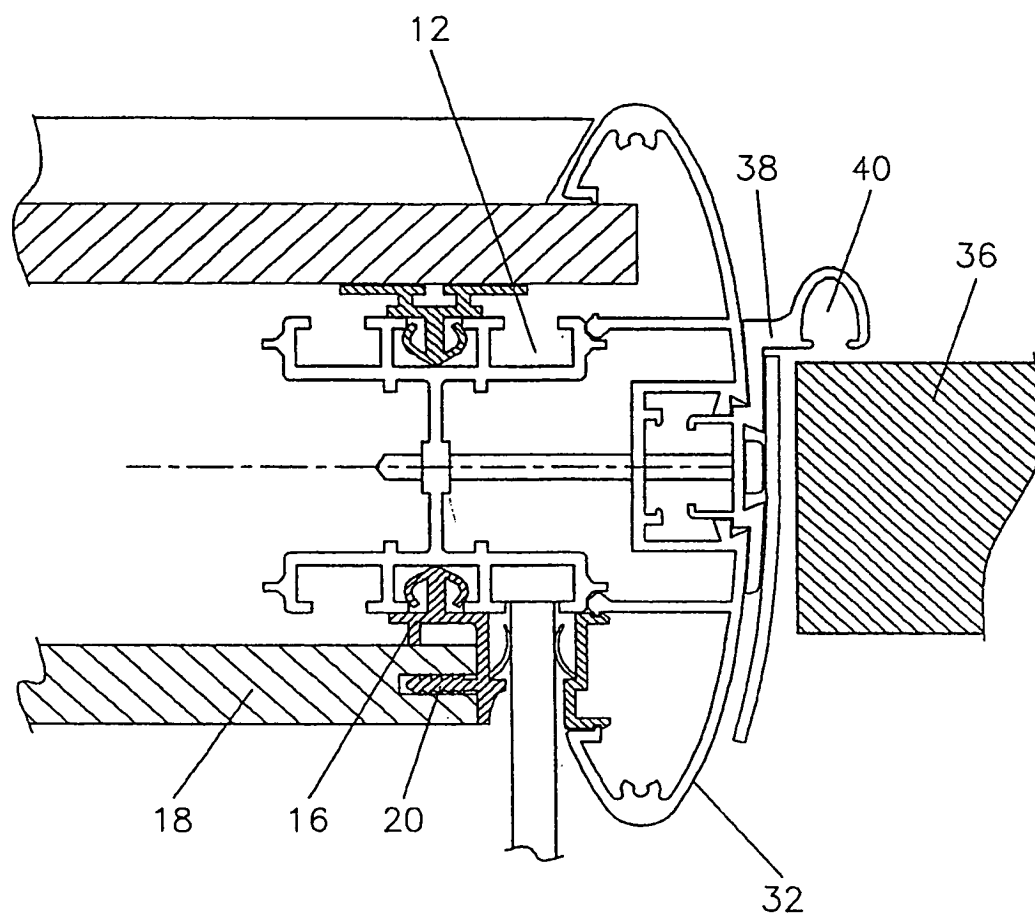


FIGURE 17

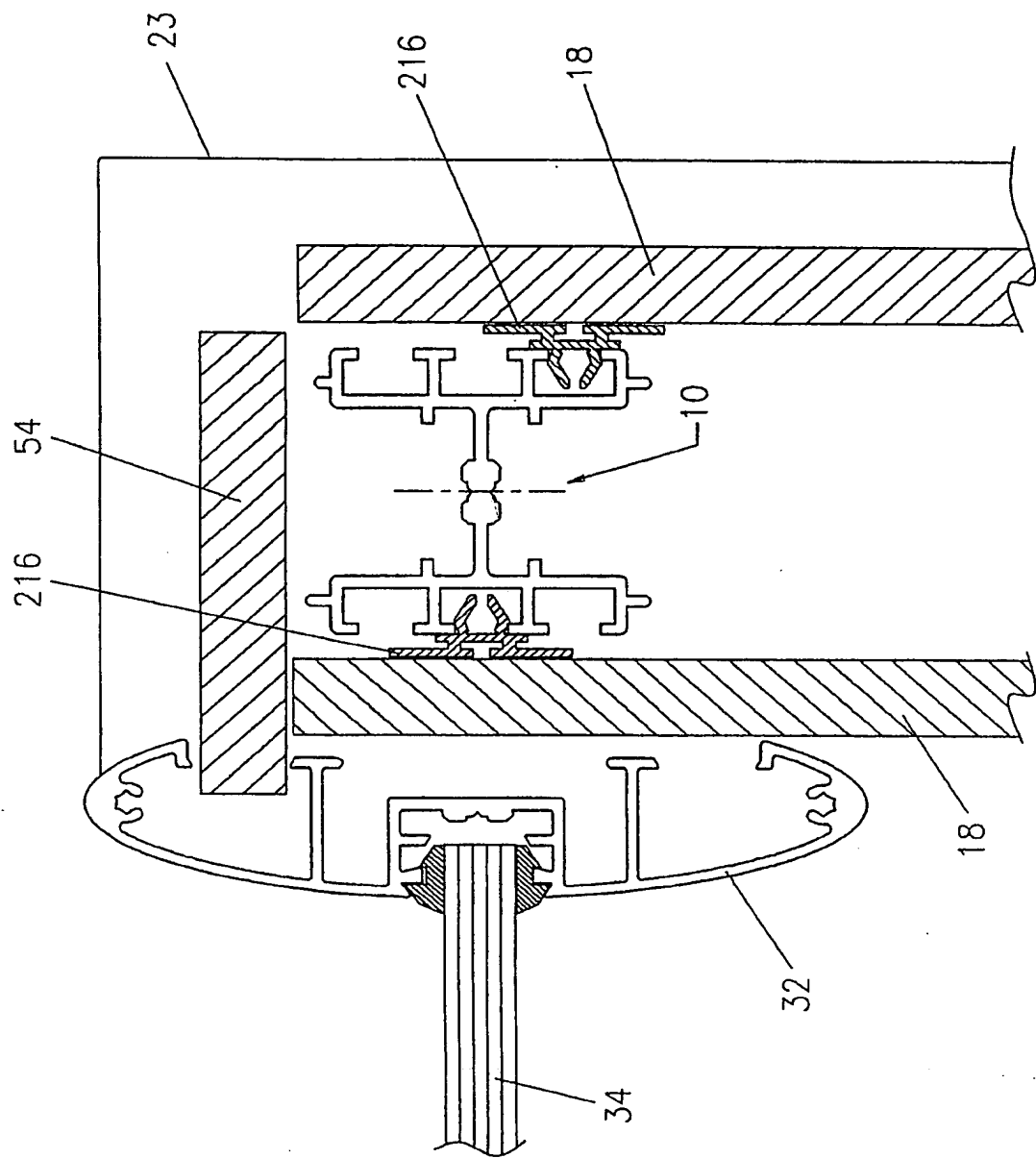


FIGURE 18

10/17

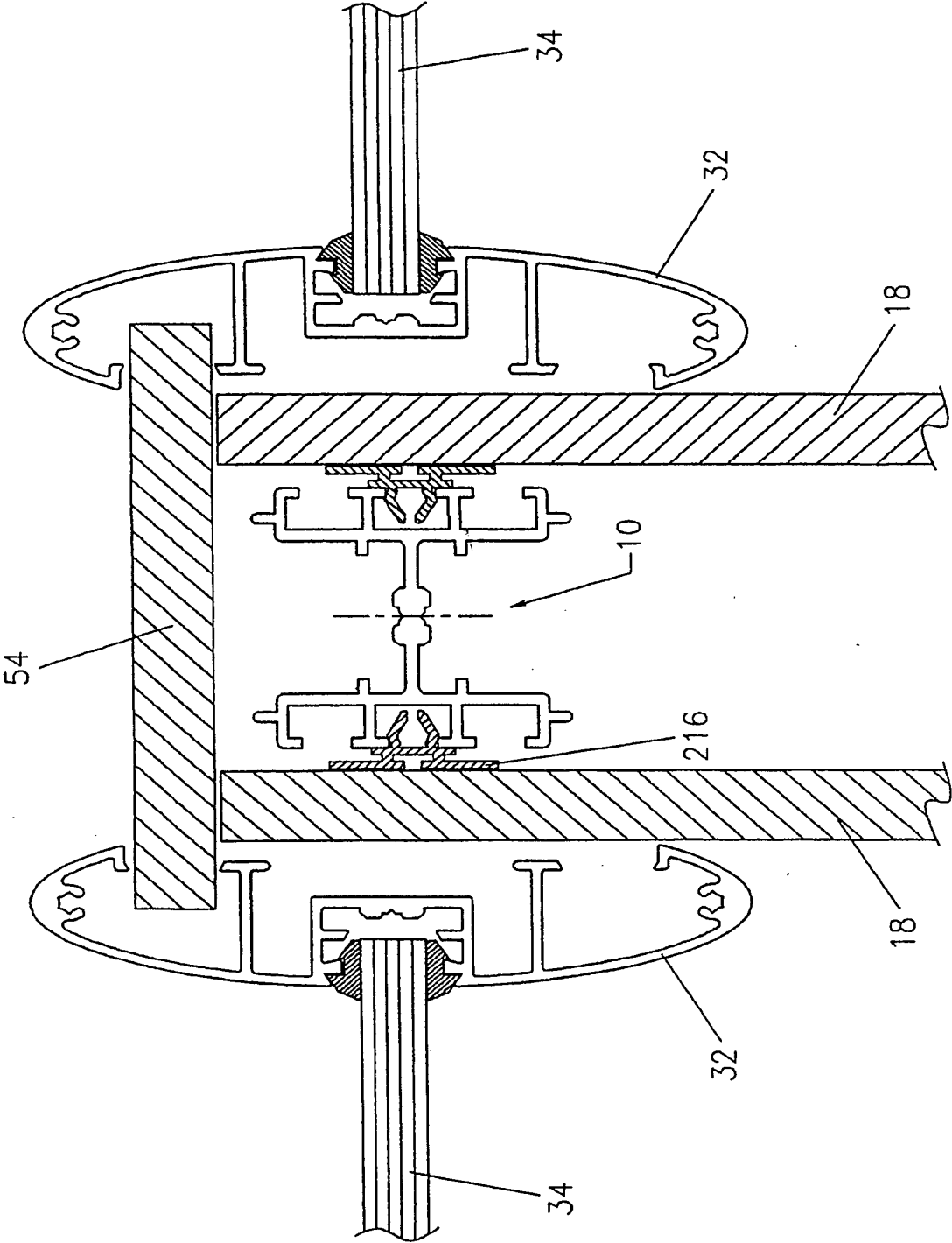


FIGURE 19

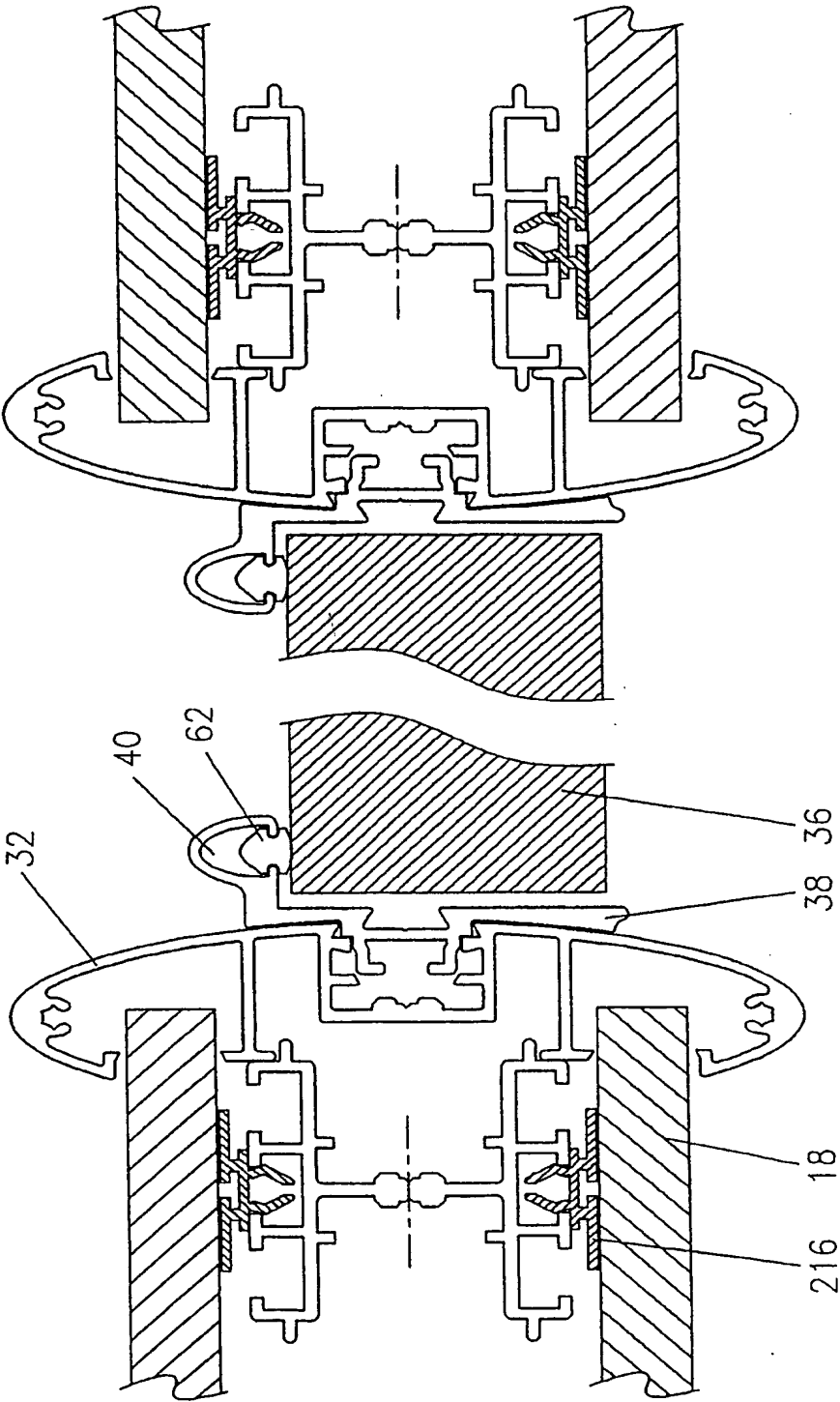


FIGURE 20



12/17

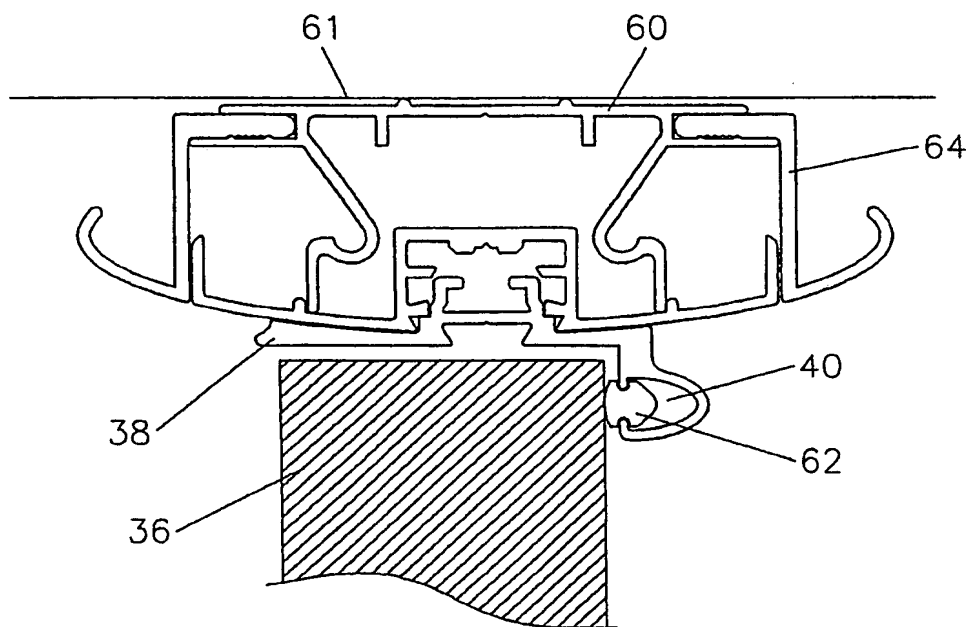


FIGURE 21

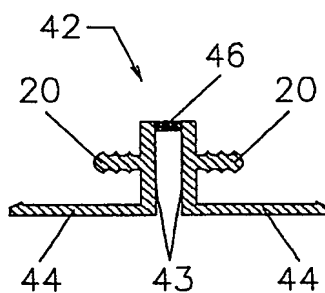


FIGURE 22

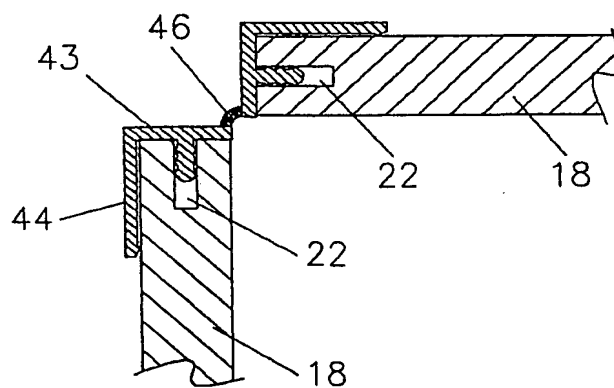


FIGURE 23

13/17

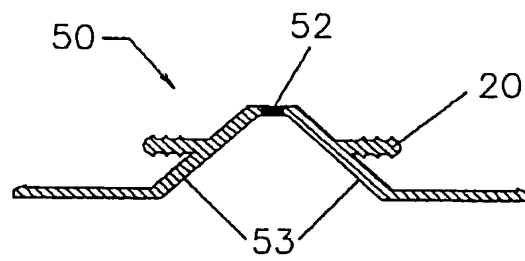


FIGURE 24

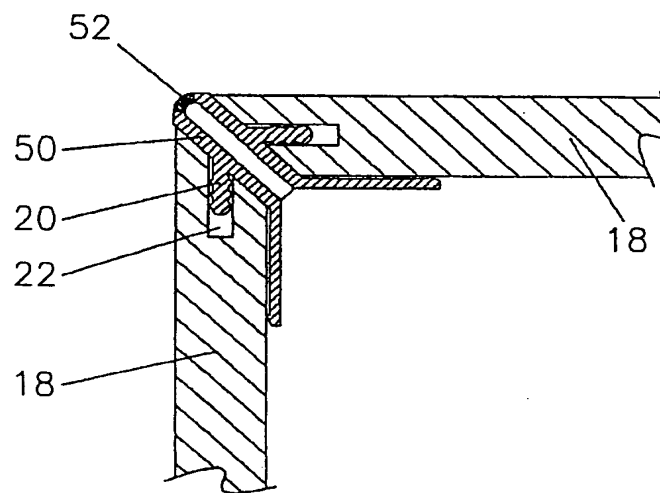


FIGURE 25

14/17

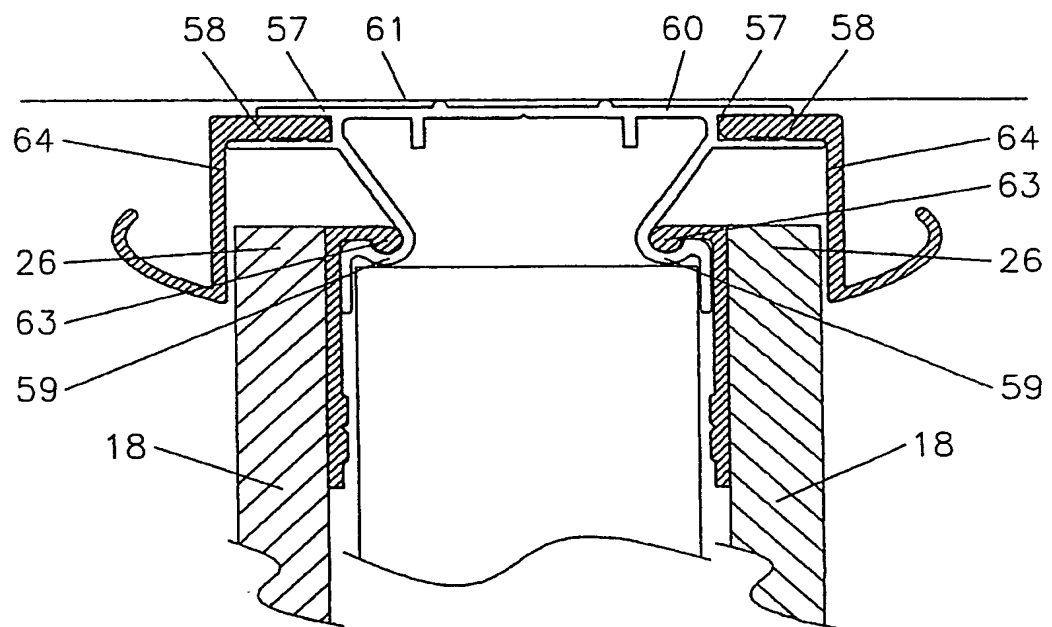
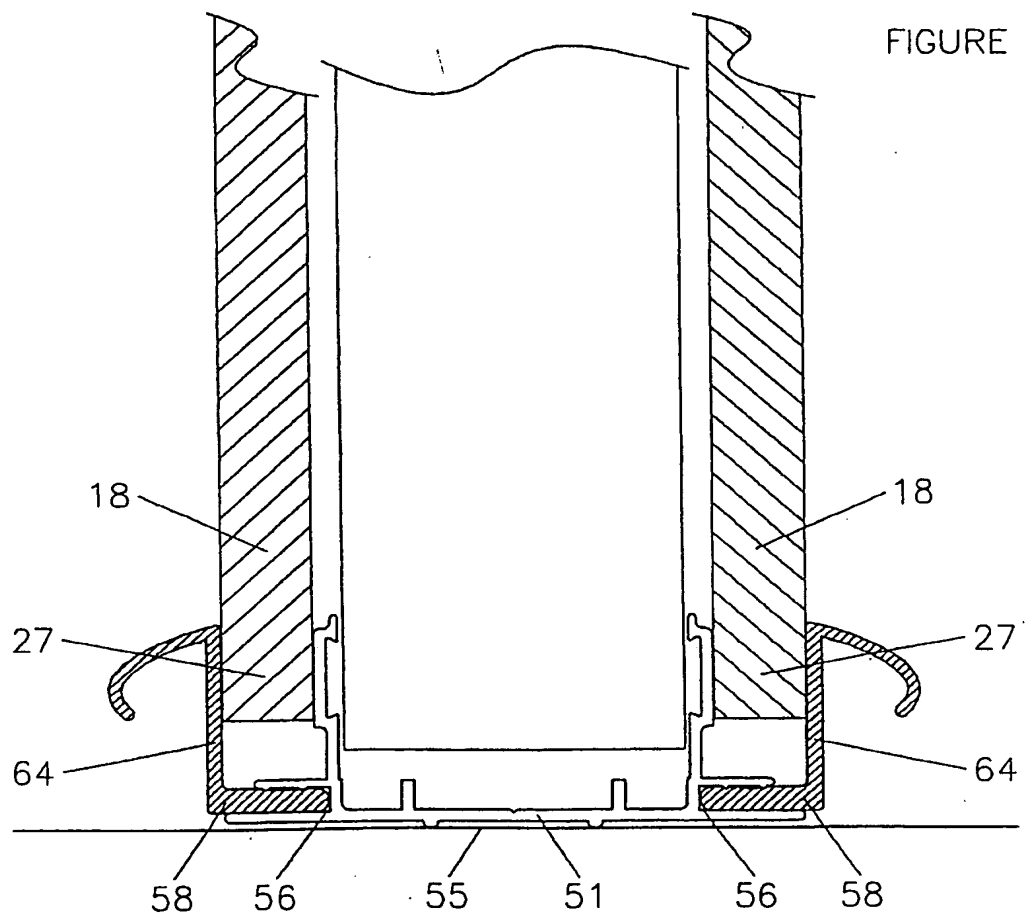


FIGURE 26



15/17

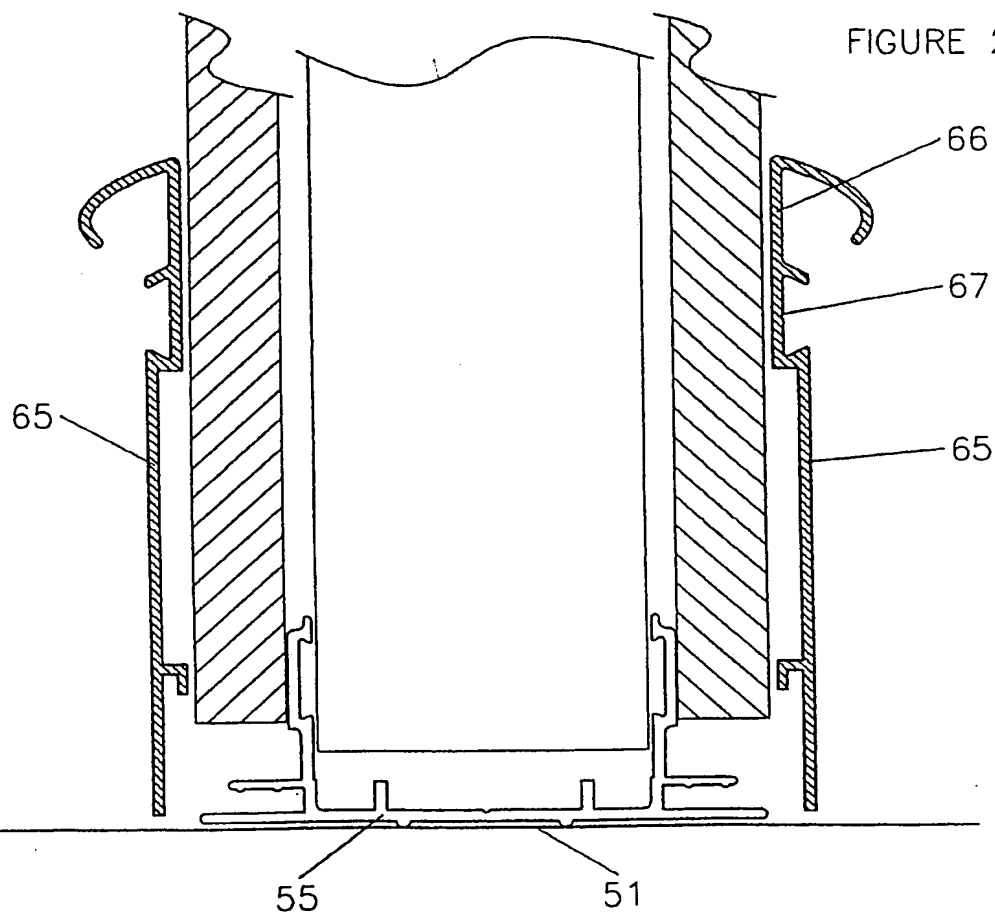
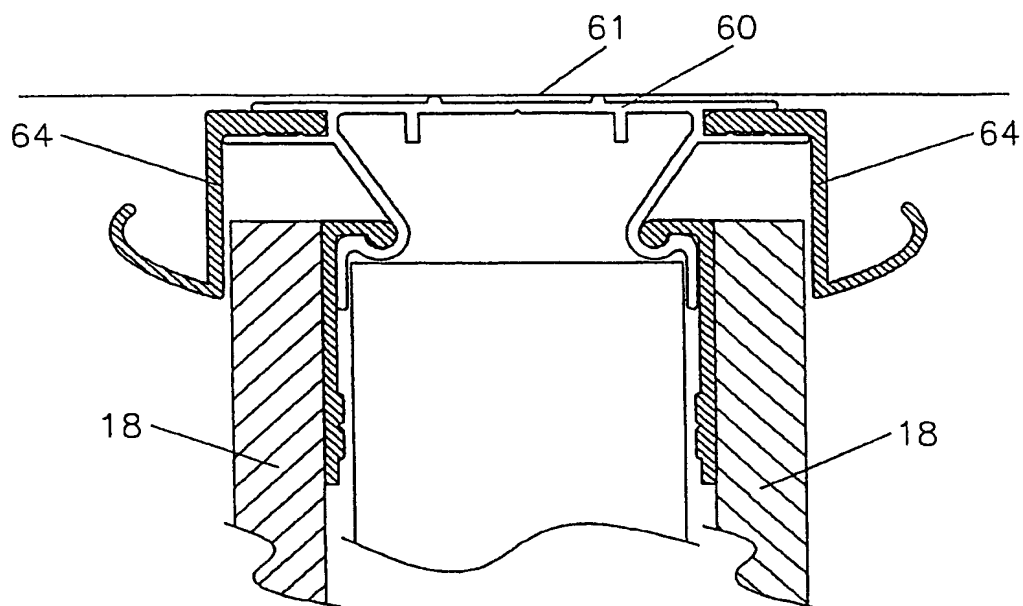


FIGURE 27

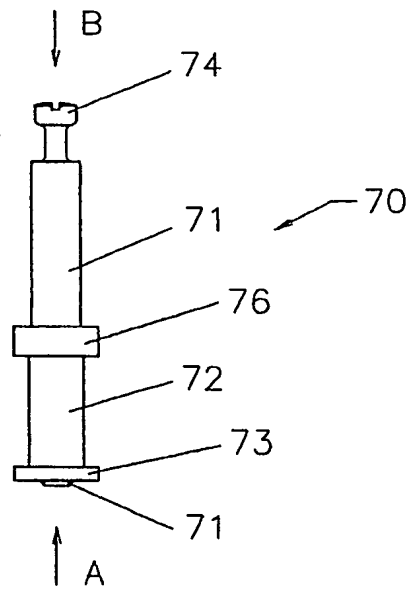


FIGURE 28

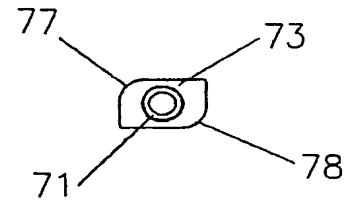


FIGURE 29

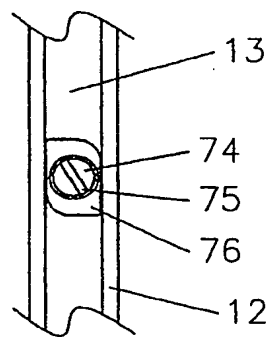


FIGURE 30

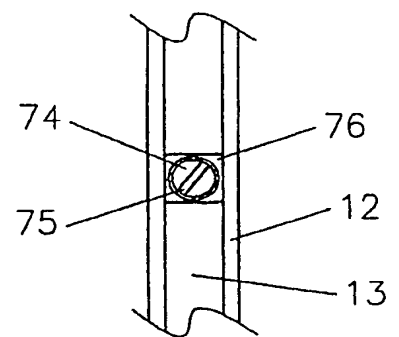


FIGURE 31

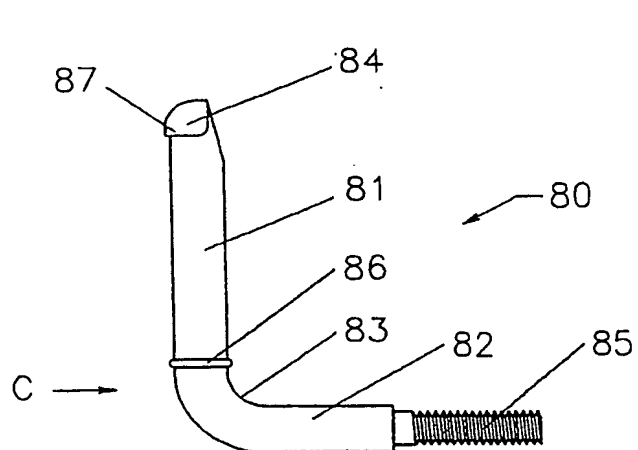


FIGURE 32

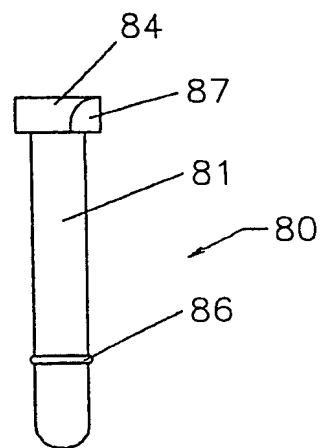


FIGURE 33

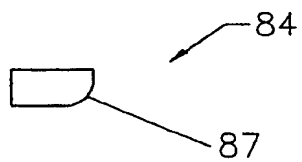


FIGURE 34

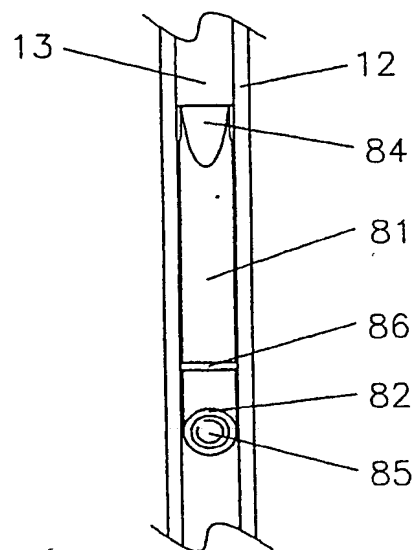


FIGURE 35

## INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/AU 97/00681

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
Int Cl <sup>6</sup> : E04B 2/78 E04C 2/38 E04C 2/40 E05D 1/02 E04B 1/82 E04 2/82		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols) IPC E04B E04C E04F F16B		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU IPC: E04B E04C E04F F16B		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DERWENT JAPIO and KEYWORDS		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AU 21057/77 A1 (JONES) 13 July 1978 whole document	1,2,4,5,6,7,8 12,14,15
X	EP 0730069 A1 (TAPPER) 4 September 1996 whole document	1,5,6,7,8,9 15,22
X	AU 55877/69 (ERNST LUST K.G.) 10 December 1970 whole document	1,2,3,4,5,6 7,8
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>		
Date of the actual completion of the international search 15 January 1998		Date of mailing of the international search report <b>21 JAN 1998</b>
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929		Authorized officer  <b>GEOFF SADLIER</b> Telephone No.: (02) 6283 2114

## INTERNATIONAL SEARCH REPORT

 International Application No.  
**PCT/AU 97/00681**

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	US 5638653 A (ROSSI) 17 June 1997 whole document	1,4,5,6,7,8
X	GB 2107754 A (MARLEY HALEY EXPOSYSTEMS LTD) 5 May 1983 whole document	1,2,5,6,7,9, 11,15
X	FR 2449174 A (MODAL) 12 September 1980 whole document	1,2,3,4,5,
X	DE 3613574 A1 (PUSCHKARSKI) 23 December 1987 Figures 5, 7, 10-13	16,18,20
X	EP 0609951 A1 (PELLA) 10 August 1994 Figure 2a	16-17,19
X	WO 91/08358 A1 (SILENTIA AB) 13 June 1991 whole document	16-20
X	AU 84217/82 B (HEINZ) 2 December 1982 whole document	25-27
X	US 5042555 (OWENS) 27 August 1991 Figure 4	25-28
A	WO 81/03043 (BREEDVELD BEHEER B.V.) 29 October 1981 Figure 1	25-28
P,A	DE 29618340 (LIENHOP) 27 March 1997 whole document	1-5
P,A	US 5644878 (WEHRMANN) 8 July 1997 whole document	1-15 21-24



## INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/AU 97/00681**Box I** Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

**Box II** Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-5 are directed to a stud having channels adapted to receive a cooperating means which cooperating means is included in a joining clip (claims 6-15) and in a bracket (claims 21-24). It is considered that the interaction between the channels and the cooperating means on the joining clip and the bracket comprise a first "special technical feature".

2. Claims 16-20 are directed to a joining element comprising a hinge means. It is considered that the joining element comprising a hinge means being a resilient bridge comprises a second separate "special technical feature".

continued on extra sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International Application No.  
PCT/ AU 97/00681

## Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No:II

3. Claims 25-28 are directed to a track, the track having a gutter adapted to receive a connecting clip attached to the end of a panel. The requirement that the track is adapted to receive a masking clip to conceal the end of the channel is considered to comprise a third separate "special technical feature".

Since the abovementioned groups of claims do not share any of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not a priori relate to one invention or to a single inventive concept.

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International Application No.  
**PCT/AU 97/00681**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
AU	21057/77	JP	52107114	NZ	179417	ZA	7700037
		NZ	184154				
EP	730069	NL	9500419				
US	5638653	CA	2151449	EP	686737	FR	2721053
		US	5638653				
GB	2107754	US	4606394				
EP	609951	AU	54852/94	NL	9300232	ZA	9400692
WO	9108358	AU	78967/91	EP	502087	SE	8903961
		US	5450694				
AU	84217/82	CA	2090493	EP	545958	FI	904214
		FI	914042	WO	9203541		
US	5042555	AU	91426/91	EP	551443	WO	9207157
WO	8103043	CH	656670	CH	659284	DK	5216/81
		DK	844/84	NL	8002187	SE	8107355
		US	4598751	US	4724884		

BEST AVAILABLE COPY